Remarks

Claims 1-9, 11, 12 and 14-24 are pending herein. Claims 2 and 12 are withdrawn from consideration as being directed to a non-elected invention. By this Amendment, claims 1, 11, 19 and 22 have been amended, and claim 13 has been canceled.

Claims 1 and 11 have both been amended to recite that the tubular supporting part forms a space together with a bottom surface of the first electrode such that the space is disposed within the tubular supporting part below the first electrode. Support for the amendments to claims 1 and 11 can be found in the specification at, e.g., Figure 1.

Claim 11 further has been amended to include the contents of canceled claim 13.

Claim 19 has been amended so as to depend upon claim 4.

Claim 22 has been amended so as to depend upon claim 14.

In the Final Office Action, claims 19 and 22 are rejected under 35 U.S.C. §112, second paragraph; claims 1, 7-9, 11 and 18 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,210,466 to Collins et al. ("Collins"); claims 3, 6, 13 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Collins in view of U.S. Patent No. 5,643,364 to Zhao et al. ("Zhao"); claims 4, 5, 14-16, 19 and 22 are rejected under §103(a) as being unpatentable over Collins in view of U.S. Patent No. 6,887,339 to Goodman et al. ("Goodman") and U.S. Patent No. 6,703,080 to Reyzelman et al. ("Reyzelman"); claims 20 and 23 are rejected under §103(a) as being unpatentable over Collins in view of U.S. Patent No. 6,089,181 to Suemasa et al. ("Suemasa"); and claims 21 and 24 are rejected under §103(a) as being unpatentable over Collins in view of Suemasa as applied to claims 20 and 23 above and further in view of U.S. Patent No. 6,242,360 to Fischer et al. ("Fischer").

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejections set forth in the Office Action.

I. Rejection of Claims 19 and 22 Under 35 U.S.C. §112

Claims 19 and 22 are rejected under §112, second paragraph, as being indefinite. According to the Office Action, there is insufficient antecedent basis for the term "the filter" in the rejected claims.

Claims 19 and 22 have been amended to depend upon claims 4 and 14, respectively. Claims 4 and 14 each provide antecedent basis for the term "the filter".

Applicants respectfully submit that claims 19 and 22, as amended herein, are not indefinite.

II. Rejection of Claims 1, 7-9, 11 and 18 Under 35 U.S.C. §102(b)

Claims 1, 7-9, 11 and 18 are rejected under §102(b) as being anticipated by Collins.

Claims 1 and 11 are independent, claims 7-9 depend directly or indirectly upon claim 1, and claim 18 depends upon claim 11.

As noted above, claims 1 and 11 have been amended to recite that the tubular supporting part forms a space together with a bottom surface of the first electrode such that the space is disposed within the tubular supporting part below the first electrode. Thus, in claims 1, 7-9, 11 and 18, the high-energy electric power supplying part is arranged in a space disposed within the tubular supporting part below the first electrode.

Because of the location of the space and the presence of the high-energy electric power supplying part therein, the power loss in Applicants' RF system is reduced remarkably.

The present specification teaches that:

> In order to make power loss on the load side as small as possible, the matching unit is usually arranged close to the processing container. On the other hand, ***the high-frequency electric power source is usually installed in a power supply room or on a rack, which is away from a clean room including the processing container***, as an auxiliary machine. [emphasis added] (page 1, line 34 – page 2, line 1.

Collins does not teach or suggest the "space" set forth in Applicants' claims and does not teach or suggest a high-energy electric power supplying part arranged in such a space.

In addition, claim 11 has been amended to include the contents of canceled claim 13. Thus, claim 11 recites that the transmission line has a length which is shorter than $3\lambda/4$, λ being a wavelength of a harmonic wave of the first high-frequency electric power, and with respect to the third harmonic wave of the first high-frequency electric power, an output terminal of the first

high-frequency electric power source is an electrically short-circuited end and an input terminal of the first matching unit is an electrically open end.

Collins does not teach or suggest the limitation previously set forth in canceled claim 13 and included in claim 11.

Therefore, for at least the foregoing reasons, Applicants respectfully submit that claims 1, 7-9, 11 and 18 are not anticipated by Collins.

III. Rejection of Claims 3, 6, 13 and 17 Under 35 U.S.C. §103(a)

Claims 3, 6, 13 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Collins in view of Zhao.

Claims 3 and 6 depend upon claim 1, and claim 17 depends upon claim 11. Thus, claims 3, 6 and 17 each include the feature of a space that is disposed within the tubular supporting part below the first electrode. As noted above, Collins does not teach or suggest the particular "space" recited in claims 1 and 11. Zhao also does not teach or suggest such a "space".

In addition, claim 11 has been amended in part herein to include the contents of canceled claim 13. According to the Office Action, it would have been obvious in view of Zhao to modify Collins so as to include a transmission line having the length previously recited in canceled claim 13 and now recited in claim 11.

Applicants respectfully submit that it would not have been obvious to modify Collins to include the transmission line of Zhao. Specifically, Applicants submit that it would not have been obvious to use the Zhao transmission line with the particular reactor taught in Collins.

Collins teaches that the invention therein is embodied in

> a plasma processing reactor in which the ***reactor itself is configured as a transmission line structure*** for coupling ac energy directly to the plasma chamber [emphasis added] (col. 3, lines 24-26).

Collins teaches that:

> ***the reactor itself is configured in part as a transmission line structure for applying high frequency plasma generating energy from a matching network to the plasma chamber 33.*** (Reference numeral 33 designates the chamber and the plasma therein.) This ***unique integral transmission line structure permits satisfaction***

> ***of the requirement of a very short transmission line*** between the matching network and the load at the frequencies of primary interest, 50-800 MHz. It enables the ***efficient, controllable application of high frequency plasma generating energy to the plasma electrodes for generating commercially acceptable etch and deposition rates at low ion energies and low sheath voltages.*** The voltages are sufficiently low to preclude sensitive damage to electrically sensitive semiconductor devices. In addition, our VHF/UHF system ***avoids the assorted shortcomings of prior art technology such as ECR- and magnetic-enhanced technologies***. [emphasis added] (col. 4, lines 30-47).

Thus, the Collins reactor itself is configured as a transmission line structure for coupling energy directly to the plasma chamber. As indicated in the above-quoted passage, the "unique integral transmission line structure" therein meets "the requirement of a very short transmission line", enables "efficient, controllable application of high frequency plasma generating energy to the electrodes", precludes "sensitive damage to electrically sensitive semiconductor devices" and "avoids the assorted shortcomings of prior art technology such as ECR- and magnetic-enhanced technologies." Applicants submit that it would not have been obvious to use the Zhao transmission line in Collins because the Collins reactor itself is configured to act as transmission line structure. In other words, it is not clear whether the Zhao transmission line would provide any benefits to the particular reactor used in Collins. Thus, Applicants submit that one skilled in the art would not have been motivated by Zhao to incorporate the transmission line therein into the Collins reactor.

Therefore, for at least the foregoing reasons, Applicants respectfully submit that claims 3, 6 and 17 would not have been obvious over Collins in view of Zhao.

IV. Rejection of Claims 4, 5, 14-16, 19 and 22 Under 35 U.S.C. §103(a)

Claims 4, 5, 14-16, 19 and 22 are rejected under §103(a) as being unpatentable over Collins in view of Goodman and Reyzelman.

Claims 4, 5 and 19 depend directly or indirectly upon claim 1, and claims 14-16 and 22 depend directly or indirectly upon claim 11.

For the reasons given above, Collins does not teach or suggest amended claims 1 and 11. Specifically, Collins does not teach or suggest the particular "space" recited in amended claims 1 and 11 or the transmission line recited in amended claim 11, i.e., a transmission line having a length which is shorter than 3 λ /4, λ being a wavelength of a harmonic wave of the first high-frequency electric power, and with respect to the third harmonic wave of the first high-frequency electric power, an output terminal of the first high-frequency electric power source is an electrically short-circuited end and an input terminal of the first matching unit is an electrically open end.

Applicants submit that Goodman and Reyzelman do not cure Collins' deficiencies relative to amended claims 1 and 11. Therefore, Applicants respectfully submit that claims 4, 5, 14-16, 19 and 22 would not have been obvious over Collins in view of Goodman and Reyzelman.

V. Rejection of Claims 20 and 23 Under 35 U.S.C. §103(a)

Claims 20 and 23 are rejected under §103(a) as being unpatentable over Collins in view of Suemasa.

Claim 20 depends upon claim 1, and claim 23 depends upon claim 11. Thus, claims 20 and 23 include the features recited in amended claims 1 and 11, respectively. As noted above, Collins does not teach or suggest the particular "space" recited in amended claims 1 and 11 or the transmission line recited in amended claim 11, i.e., a transmission line having a length which is shorter than 3 λ /4, λ being a wavelength of a harmonic wave of the first high-frequency electric power, and with respect to the third harmonic wave of the first high-frequency electric power, an output terminal of the first high-frequency electric power source is an electrically short-circuited end and an input terminal of the first matching unit is an electrically open end.

Applicants respectfully submit that Suemasa does not cure Collins' deficiencies relative to amended claims 1 and 11. Therefore, Applicants submit that claims 20 and 23 would not have been obvious over Collins in view of Suemasa.

VI. Rejection of Claims 21 and 24 Under 35 U.S.C. §103(a)

Claims 21 and 24 are rejected under §103(a) as being unpatentable over Collins in view of Suemasa and further in view of Fischer.

Claims 21 and 24 depend directly or indirectly upon amended claims 1 and 11, respectively. Therefore, Collins does not teach or suggest claims 21 and 24 for at least the same reasons Collins does not teach or suggest amended claims 1 and 11, respectively. Suemasa and Fischer do not cure the failure of Collins' teachings relative to amended claims 1 and 11. Thus, for at least this reason, Applicants respectfully submit that claims 21 and 24 would not have been obvious over Collins in view of Suemasa and further in view of Fischer.

VII. Conclusion

In view of the amendments and remarks herein, Applicants respectfully request that the objection and rejections set forth in the Office Action be withdrawn and that claims 1, 3-9, 11 and 14-24 be allowed.

If any additional fees are due in connection with the filing of this paper, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to Deposit Account 02-4300; Order No. 033082M194.

Respectfully submitted,

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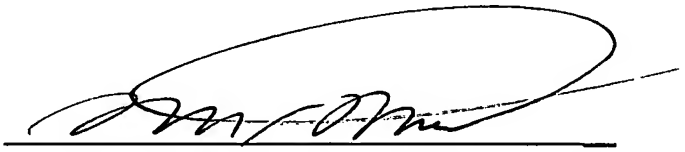

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Enclosures: (1) Request for Continued Examination
(2) Petition for Extension of Time
(3) Check for the sum of $1810